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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

ZHEN, LI B

ART UNIT	PAPER NUMBER
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2126

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/195,125

Applicant(s)

HIRONO ET AL.

Examiner

Li B. Zhen

Art Unit

2126

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) 8-23, 26-31 and 34-42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 24, 25, 32 and 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification is objected to under 35 U.S.C. 112, first paragraph, as failing to adequately teach the claimed limitations "a prescribed change in a state of said scheduling policy" as recited in claim 1 lines 6 – 7, and "disabling context switching between threads when said flag is set to correspond to the absence of context switching" and "enabling context switching between threads when said flag is set to correspond to presence of context switching" as recited in claim 24 lines 7 – 8 and 12 – 13.

There does appear to be a written description of a state of a scheduling policy in the application as filed. In addition, a scheduling policy generally describes how a thread is scheduled for execution relative to the other threads. It is unclear to the examiner as to how a scheduling policy can have a state.

As to "disabling context switching between threads when said flag is set to correspond to the absence of context switching" and "enabling context switching between threads when said flag is set to correspond to presence of context switching," applicant discloses throughout the specification that context switch can occur while the flag is set to correspond to the absence of context switching. For example, see p. 18, lines 5 – 16; p. 23, lines 7 – 20; p. 34, lines 4 – 20; p. 35, lines 17 – 25; p. 36, lines 15 –

20; and p. 37, lines 18 – 28; figures 15A, 15B, 19 and 20. The thread makes an API call to request start of detection of presence/absence of a context switching which results in the flag being set to a state corresponding to absence of a context switching (p. 23, lines 10 – 14 of specification). When a context is switched by a scheduler after the flag is set to the state corresponding to the absence of context switch, the flag is set to a state corresponding to the presence of context switching (p. 23, lines 14 – 17 of specification). A context switch occurs after the flag is set to the state corresponding to the absence of context switch; therefore, the flag in a state corresponding to the absence of context switching does not disable context switch. In addition, the flag in a state corresponding to the presence of context switch does not enable context switch because a context switch can occur when the flag is set to a state corresponding to the absence of context switch. The examiner interprets disable context switch as preventing context switch and enabling context switch as allowing context switch. However, the flag does not prevent or allow context switch because a context switch occurs even though the flag is set to a state corresponding to the absence of context switch (p. 23, lines 14 – 17 of specification). Therefore, the applicant fails to disclose “disabling context switching between threads when said flag is set to correspond to the absence of context switching” and “enabling context switching between threads when said flag is set to correspond to presence of context switching” in the specification as filed.

2. Claims 1 – 7 and 24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant recites the limitation "a prescribed change in a state of said scheduling policy" as recited in claim 1, and "disabling context switching between threads when said flag is set to correspond to the absence of context switching" and "enabling context switching between threads when said flag is set to correspond to presence of context switching" as recited in claim 24 lines 7 – 8 and 12 – 13. There does not appear to be a written description of the claimed limitation in the application as filed, for the reasons set forth in the objection to the specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,355,484 to Record.

As to claim 1, Record teaches a program control apparatus for controlling execution of a program in a computer system (computer operating system which manages events; column 2, lines 40 – 45), a predetermined first application program interface call (EventMonitorCreate function 42, Fig. 1) from a thread (event monitor definers 17a-d, Fig. 1) for setting a prescribed flag to one of first and second states

(specifying the event monitor parameters; column 6, lines 23 – 40), detecting a prescribed change in a state of said computer system, and for setting said flag to the other one of said first and second states (event signalers 18a,b, and 15a,b detect the occurrence of events and signal the event manager 26, Fig. 1), and a predetermined second application program interface call from the thread for returning a value indicative of the state of the flag to the thread (EventManagerQuery; column 26, lines 46 – 67).

Note the 112 rejection above.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2, 3, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Record in view of U.S. Patent No. 5,898,873 to Lehr.

As to claim 2, this is similar to claim 1 with the exception of monitoring the presence/absence of a context switching. Record teaches monitoring events but does specify monitoring context switching events.

However, Lehr teaches monitoring the presence/absence of a context switching (logs a context switch [dispatch event]; column 6, lines 5 – 10 and 28 – 45).

It would have been obvious to apply the teaching of monitoring the presence/absence of a context switching as taught by Lehr to the invention of Record

because this would provide context switch information to threads interested in the notification of context switches.

As to claim 3, Record teaches invalidating processing of said thread from said application program interface call requiring start of detection of presence/absence of a context switching until said application program interface call requesting termination of detection of presence/absence of a context switching (it may be important to suspend execution of the other program threads if the event is a system failure which requires an abend; column 9, lines 40 – 46).

As to claim 32, this is a product claim that corresponds to apparatus claim 2; note the rejection for claim 2 above, which also meets this product claim.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Record and Lehr in view of U.S. Patent No. 6,212,544 to Borkenhagen.

As to claim 4, Record as modified does not teach alternately changing priority of a thread to high and low.

However, Borkenhagen teaches (column 19, lines 1 – 20) alternately changing priority of said thread to high and low (thread switch manager alters the actions performed by the hardware thread switch logic to effectively change the relative priority of the threads) based on process time and remaining time (can raise the priority of the thread to influence the response time of the thread to the event).

It would have been obvious to apply the teaching of alternately changing priority of said thread to high and low based on process time and remaining time as taught by

Borkenhagen to the invention of Record as modified because this would assure that the threads are processed within the amount of time they are required to.

8. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Record and Lehr in view of U.S. Patent No. 5,088,036 to Ellis.

As to claims 5 and 6, Record as modified does not teach a garbage collection thread and a memory compaction thread.

However, Ellis teaches a garbage collection thread (garbage collector; column 5, lines 50 – 57) that copies an object which is referenced by any other object to a prescribed area in the heap area (garbage collector initially copies only the root objects to new-space; column 5, lines 50 – 57), and a memory compaction thread (collector threads; column 11, lines 52 – 67) that frees a memory area of an object not referenced by any other object in a memory heap area (collector discards the pages, which discards the backing store and physical memory attached to those pages. Backing store and physical memory will be reallocated on demand; column 11, lines 46 – 52).

It would have been obvious to apply the teaching of a garbage collection thread and a memory compaction thread as taught by Ellis to the invention Record as modified because garbage collection would provide efficient memory usage by deallocating unused memory and reusing the memory.

9. Claims 7, 25 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Record in view of U.S. Patent No. 5,842,016 to Toutonghi.

As to claim 7, this is similar to claim 1 with the exception of monitoring the presence/absence of a data write to a designated memory area. Record teaches

monitoring events but does specify monitoring the presence/absence of a data write to a designated memory area.

However, Toutonghi teaches (column 2, lines 47 – 67) an application program interface call (DisableGarbageCollection API) which requests start of detection of presence/absence of a data write to a designated memory area (reference-accessing sections), setting a flag indicating presence/absence of a data write to a state corresponding to absence of a data write (DisableGC flag is a flag that may have two states: "set" and "reset." The DisableGC flag is set by the DisableGarbageCollection API, and is reset by the EnableGarbageCollection API; column 7, lines 30 – 67), setting said flag to a state corresponding to presence of a data write when there is a data write to the designated memory area (EnableGC event is an event that also has the same two states, "set" and "reset." The EnableGC event is set when the thread calls the EnableGarbageCollection API, and is reset when the thread calls the DisableGarbageCollection API; column 7, lines 30 – 67), and in response to an application program interface call (EnableGarbageCollection API after reference-accessing section) which requests termination of detection of presence/absence of a data write to the designated memory area, and returning a value corresponding to the state of the flag to the thread (thread 1 exits its current reference-accessing section and calls the EnableGarbageCollection API. The EnableGarbageCollection API returns immediately; column 5, lines 30 – 35). Toutonghi teaches resetting the DisableGC flag after reference-accessing sections. Reference accessing can be either reading a reference or writing a reference. Therefore, Toutonghi teaches setting a flag (reset

DisableGC flag) when there is a data write (reference-accessing is either read access or write access) to the designated memory area (object references).

It would have been obvious to apply the teaching of monitoring the presence/absence of a data write to a designated memory area as taught by Toutonghi to the invention of Record because this would assure access to a designated memory area is synchronized.

As to claim 25, this is a method claim that corresponds to apparatus claim 7; note the rejection for claim 7 above, which also meets this method claim.

As to claim 33, this is a product claim that corresponds to apparatus claim 7; note the rejection for claim 7 above, which also meets this product claim.

10. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Record and Lehr in view of U.S. Patent No. 6,061,711 to Song.

As to claim 24, this is similar to apparatus claim 2 with the additional limitations of disabling context switching between threads when the flag is set to correspond to the absence of context switching and enabling context switching between threads when the flag is set to correspond to presence of context switching. Record as modified does not teach enabling and disabling context switch. Also, note the 112 rejection to claim 24 above.

However, Song teaches (column 10, lines 21 – 35; column 10, line 55 – column 11, line 5; column 11, lines 40 – 46) disabling context switching (has not requested context switch) when the flag (CSE, context switch enable bit) is set to correspond to the absence of context switching (CSE bit is not set) and enabling context switching

(request context switch) when the flag (CSE, context switch enable bit) is set to correspond to presence of context switching (CSE bit is set to one).

It would have been obvious to apply the teaching of enabling and disabling context switch as taught by Song to the invention of Record as modified because this allows context switch to be controlled (column 11, lines 8 – 14 of Song). Obviously, the teaching of Song can be applied at the software level and allow threads to control context switch.

Response to Arguments

11. Applicant's arguments filed on March 19, 2003 have been fully considered but they are not persuasive.

The applicant submits, "the claims as amended, either require (1) disabling/enabling context switching based on the state of a flag which can be controlled via API routines; or (2) monitoring setting up a flag and having the flag determine whether a designated memory region has been written" (p. 7, line 31 – p. 8, line 3). The examiner respectfully disagrees because independent claims 1 and 32 do not require any of the limitations listed above. For example, claims 1 and 32 do not require disabling/enabling context switch or setting up a flag and having the flag determine whether a designated memory region has been written. Also note the 112 rejection of claims 1 and 24 above.

Applicant argues that "Toutonghi does not disclose or suggest 'setting said flag to a state corresponding to presence of a data write when there is a data write to the designated memory area'" (p. 8, lines 26 – 28). The examiner respectfully disagrees

because Toutonghi teaches (column 2, lines 47 – 67; column 7, lines 30 – 67) setting a flag to a state corresponding to presence of a data write (EnableGC event is set when the thread calls the EnableGarbageCollection API) when there is a data write (EnableGarbageCollection API after reference-accessing sections) to the designated memory area (object references). Toutonghi teaches resetting the DisableGC flag after reference-accessing sections. Reference accessing can be either reading a reference or writing a reference. Therefore, Toutonghi teaches setting a flag (reset DisableGC flag) when there is a data write (reference-accessing is either read access or write access) to the designated memory area (object references).

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. The applicant's amendment claim 24 include new limitations "disabling context switching between threads when said flag is set to correspond to the absence of context switching" and "enabling context switching between threads when said flag is set to correspond to presence of context switching" necessitated the new reference U.S. Patent No. 6,061,711 to Song. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

Art Unit: 2126

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Li B. Zhen whose telephone number is (703) 305-3406.

The examiner can normally be reached on Mon - Fri, 8am - 4:30pm.

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Li B. Zhen
Examiner
Art Unit 2126



lbz
May 27, 2003